BY ORDER OF THE
SECRETARY OF THE AIR FORCE

AIR FORCE OCCUPATIONAL SAFETY AND HEALTH STANDARD 91-32

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Safety

EMERGENCY SHOWER AND EYEWASH UNITS

OPR: HQ AFSC/SEGS (Karen N. Kinkle)

Certified by: HQ AFSC/SEG
(Colonel Robert W. Scott)

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The criteria in this standard are the Air Force's minimum safety, fire prevention, and occupational health requirements for emergency shower and eyewash units. Major commands (MAJCOM), direct reporting units (DRU), and field operating agencies (FOA) may supplement this standard when additional or more stringent safety, fire prevention, and health criteria are required. Refer to Air Force Instruction (AFI) 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program,* for instructions on processing supplements or variances. Report conflicts in guidance between this standard, federal standards, or other Air Force directives through MAJCOM, DRU, or FOA ground safety offices to Headquarters, Air Force Safety Center, Ground Safety Division, Safety Engineering and Standards Branch (HQ AFSC/SEG), 9700 G Avenue, SE, Suite 222, Kirtland AFB NM 87117-5670.

The illustrations contained herein are provided for information only so the various units will be easily recognizable. There are many different makes, styles, and combinations available. They must be selected carefully so the proper unit for the use intended in obtained.

This standard addresses selection, acquisition, location, installation, maintenance, and testing of emergency shower and eyewash units. Also included are performance specifications for both permanently-installed and self-contained units. Types of equipment covered are emergency showers, eyewash units, eye and face units, combination units, hand-held drench hoses, and eyewash bottles. There is minimal coverage of this subject in Occupational Safety and Health Administration (OSHA) standards and most of the information in this standard is Air Force developed, as derived from American National Standards Institute (ANSI) Z358.1, *Emergency Eyewash and Shower Equipment.*

No Technical Order (TO), AFOSH Standard, or Operating Instruction can possibly address every hazard or potential hazard that may arise from a specific task or combination of tasks. Where situations exist that do not appear to be adequately covered by existing directives, use an Operational Risk Management (ORM) process to assess risk associated with those situations and determine adequate safeguards or procedures to manage the risk. **NOTE:** The ORM process may not be used to violate directives or other regulatory guidance. Normal waiver or variance procedures must be followed in all cases (refer to the first paragraph on page 1).

SUMMARY OF REVISIONS

Administrative changes have been made to update this standard to electronic format. Paragraphs have been renumbered and references updated. Requirement to use the ORM process is addressed in the first paragraph on page 1. A glossary of references and supporting information is at **Attachment 1**. A bar (|) preceding a paragraph indicates changes from the previous edition. **NOTE:** AFOSH 127-series standards are being converted to 91-series standards and 161-series to 48-series standards. However, not all standards have been converted as of the effective date of this standard. To help you locate these documents, references to AFOSH standards are stated in the updated series and standard number, in the references section of **Attachment 1**.

1. Hazards and Human Factors 2
2. General Requirements: 2
3. Performance Specifications and Installation Requirements for Permanent 7
Figure 1. Permanent Combination Emergency Shower and Face and Eyewash Unit. 10
Figure 2. Self-Contained Non-Pressurized Eye Wash Unit. 11
Figure 3. Eyewash Bottle. 11
Figure 4. Hand-Held Drench Hose (Permanent). 12
Figure 5. Activating Mechanisms. 13
Figure 6. Multiple-Spray Shower and Eyewash. 14
Figure 7. Wall-Mounted Permanent Eye and Face Wash. 15
Attachment 1—GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION 16
Attachment 2—EMERGENCY SHOWER AND EYEWASH UNITS CHECKLIST 19

1. Hazards and Human Factors . Protection of the eyes and face is important in the industrial environment. The best means of protection is to engineer hazards out of the job so the worker is not exposed. If this is not possible, safety goggles and face shields should be worn as needed. Eyewash units, eye and face units, deluge showers and other similar devices are emergency equipment and not a substitute for protective devices. Eye, face, and body injuries may be caused by exposure to chemicals, by materials thrown from a machine, and when air pressure or the wind propels substances at sufficient velocity to be injurious. Other eye and face injuries may occur when harmful liquids are sprayed, squirted, splattered, dropped, or dripped.

2. General Requirements:

2.1. Regulatory Federal Requirements . There are minimal safety requirements for emergency showers and eyewash units in OSHA standards. Existing OSHA requirements are quoted in paragraphs **2.1.1.** and **2.1.2.** Air Force guidance and functional application are contained in the remainder of this standard beginning with paragraph **2.2.** The Air Force guidance in this standard includes all regulatory OSHA requirements and will be followed.

2.1.1. Occupational Safety and Health (OSHA) Standards:

2.1.1.1. OSHA Standard 29 Code of Federal Regulations (CFR) 1910.94(d)(9)(vii), *Ventilation, Open Surface Tanks* (Subpart G, *Occupational Health and Environmental Control)*: "Near each tank containing a liquid which may burn, irritate, or otherwise be harmful to the skin if splashed upon the worker's body, there shall be a supply of clean cold water. The water pipe (carrying a pressure not exceeding 25 pounds) shall be provided with a quick-opening valve and at least 48 inches of hose not smaller than three-fourths of an inch, so that no time may be lost in washing off liquids from the skin or clothing. Alternatively, deluge showers and eye flushes shall be provided in cases where harmful chemicals may be splashed on parts of the body."

2.1.1.2. OSHA Standard 29 CFR 1910.111, *Storage and Handling of Anhydrous Ammonia* (Subpart H, *Hazardous Materials)*:

2.1.1.2.1. Paragraph (b)(10)(iii) states: "Stationary storage installations shall have an easily accessible shower or a 50-gallon drum of water."

2.1.1.2.2. Paragraph (b)(10)(iv) says: "Each vehicle transporting ammonia in bulk except farm applicator vehicles shall carry a container of at least 5 gallons of water and shall be equipped with a full-face mask."

2.1.1.3. OSHA Standard 29 CFR 1910.151(c), *Medical Services and First Aid* (Subpart K, *Medical and First Aid*) states: "Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use." **NOTE**: Appendix C, Interpretations, OSHA Instruction Standard 1-8.2, 8 Mar 1982 interprets this section to be applicable to facilities required for immediate emergency use in electric storage battery charging and maintenance.

2.1.1.4. OSHA Standard 29 CFR 1910.268(b)(2)(i), *Telecommunications, Battery Handling* (Subpart R, *Special Industries)* states: "Eye protection devices which provide side as well as frontal eye protection for employees shall be provided when measuring storage battery specific gravity or handling electrolyte, and the employer shall ensure that such devices are used by the employees. The employer shall also ensure that acid resistant gloves and aprons shall be worn for protection against spattering. Facilities for quick drenching or flushing of the eyes and body shall be provided unless the storage batteries are of the enclosed type and equipped with explosion proof vents, in which case sealed water rinse or neutralizing packs may be substituted for the quick drenching or flushing facilities. Employees assigned to work with storage batteries shall be instructed in emergency procedures such as dealing with accidental acid spills."

2.1.2. Safety and Health Regulations for Construction:

2.1.2.1. OSHA 29 CFR 1926.50(g), *Medical Services and First Aid* (Subpart D, *Occupational*

Health and Environmental Controls), says: "Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use."

2.1.2.2. OSHA 29 CFR 1926.441(a)(6), *Batteries and Battery Charging* (Subpart K, *Electrical)* says: "Facilities for quick drenching of the eyes and body shall be provided within 25 feet (7.62 m) of battery handling areas." **NOTE:** This is a limited OSHA requirement applicable only to the construction industry. For consistency, the Air Force will use a uniform 10-second distance criteria for all work situations. Refer to paragraph **2.6.**

2.2. Effective Dates . The criteria in this standard are effective as of the publishing date of the standard. Any installation of emergency shower or eyewash units, construction and (or) renovation projects, and system design projects after the date of this publication will conform to this standard. Those previously installed units that do not meet the criteria of this standard will be evaluated by installation ground safety and bioenvironmental engineering (BE) staffs. In areas where employees are exposed to severe hazards, the units will be brought into compliance with this standard. If employee exposure is minimal, existing units may be used until there is a need to replace or modify them.

2.3. Responsibilities . Each supervisor is responsible for ensuring that emergency showers and eyewashes are provided, inspected, tested, and maintained according to this standard. As a minimum, emergency showers and (or) eyewashes will be provided in those areas specifically designated in paragraph **2.1.** Careful consideration will be exercised in requiring emergency showers and (or) eyewashes in areas other than those identified. Evaluations for each request for emergency showers and (or) eyewashes will be made by ground safety and BE staffs to determine the need for the installation of units. Rationale for decisions made will be documented and maintained in respective facility case files. The type of material used, its properties, how the material is dispensed, probability of injury, extent of potential injury, and personal protective equipment (PPE) available and used are a few of the issues which will be considered prior to determining the need for the units. Emergency showers and eyewashes **are not** a substitute for personal protective equipment and personnel will use proper PPE when required (refer to AFOSH Standard 91-31, *Personal Protective Equipment*. Also, refer to AFOSH Standard 91-31 for information regarding the wear of contact lenses).

2.4. Equipment:

2.4.1. Permanently-installed shower and eyewash units (**Figure 1.**) provide the best emergency protection for personnel whose eyes or body have been exposed to hazardous materials. Self-contained units (**Figure 2.**) and eyewash bottles (**Figure 3.**), at best, offer minimum protection and their use will be restricted to the provisions of paragraphs **2.4.3.** through **2.4.5.** and then only with approval of the installation ground safety manager and bioenvironmental engineer (BEE).

2.4.2. Hand-held drench hoses (**Figure 4.**) support shower and eyewash units but do not replace them. They can be used in cases where the user is in an awkward position physically or to reach parts of the face or body that are inaccessible to the fixed stream of the shower or eyewash. Eyes are usually washed with a spent stream which is accomplished by holding the hose up and washing the eye at the point where the stream has a minimum pressure.

2.4.3. Self-contained units provide minimum employee protection and will only be used when approved by the installation ground safety manager and the BEE. The following situations warrant considering these units:

2.4.3.1. As an interim fix, pending installation of a permanently-installed unit.

2.4.3.2. If the employee is exposed to irritants rather than substances that could damage the eye.

2.4.3.3. In temporary locations where a permanent installation would not be economically feasible or may not be possible.

2.4.3.4. In field operations, such as remote Intercontinental Ballistic Missile (ICBM) sites, where a source of potable water is not available.

2.4.4. Eyewash bottles are not a replacement for other type units. An eyewash bottle may be kept in the immediate vicinity where employees are working on extremely hazardous operations. These units supply immediate flushing, and with this accomplished, the individual may then proceed or be helped to a permanently-installed or self-contained unit and flush the eyes more thoroughly.

2.4.5. Personnel working in remote areas where eyewash facilities are not readily available could be exposed to dust, fuels, solvents, and other materials that if blown or splashed into the eyes are not normally injurious but will definitely be an irritant. A quick flushing of the eyes is usually very beneficial prior to medical treatment and vehicles supporting such operations should be equipped with eyewash bottles or other means of flushing the eyes.

2.5. Acquisition . Emergency shower and eyewash equipment may be both locally and centrally procured. When Military Specifications (Mil Spec) are available, they should be used for the purchase of this equipment. When Mil Specs are not used, the procuring document shall include a requirement for the equipment to meet or exceed ANSI Z358.1 specifications.

2.6. Location . Emergency showers and eyewash units shall be installed and operable where required by paragraph **2.3.** They shall be in conspicuously identified accessible locations that require no more than **10 seconds to reach and be within 100 feet of the corrosive substance**. Some corrosive substances have a very fast reaction time and exposure to them would require that the emergency shower and eyewash unit be located closer than the previously stated 10 second and 100-feet distance criteria. The installation ground safety manager and BEE should be consulted for assistance in determining when more stringent criteria are warranted. The unit should be located as close to the hazard as possible without physically causing a hazard itself and shall not be located where the water spray could contact any energized electrical circuit. Because the shower unit functions with large volumes of water flowing downward, it is unsuitable for washing contaminants from the eyes. It is therefore advisable that the shower be installed as close to, or in conjunction with, eye and face or eyewash facilities.

2.7. Installation . Permanently-installed units shall be assembled, installed, and tested by qualified civil engineers and (or) contractor personnel following the manufacturer's instructions and (or) the applicable portion of paragraph **3.** Facility design requirements will be considered prior to installation. Units will be connected to a supply of water that is free from contamination and equal in purity to potable water. Water pressure must be capable of delivering a sufficient volume to produce the required columns and sprays shown in the manufacturer's instructions.

2.7.1. Delivered water temperature shall not be at extremes that might be expected to discourage the unit's use, and should be in the range of 60 degrees Fahrenheit (F) to 100 degrees F. In circumstances where chemical reaction is accelerated by contact with water or increased water temperature, the BEE will be consulted for guidance. Self-contained units and the supply lines of

permanently-installed units shall be protected from freezing and from sunlight or other heat sources that could cause extremes in water temperature.

2.7.2. Permanently-installed units and self-contained units installed in fixed locations shall be identified with a highly visible sign. The area around or behind the unit, or both, may be painted with green and white stripes if needed to increase visibility. If highlighted, the painted area will be large enough to be easily identified by the user. Emergency units shall be well lighted. If possible, at least 50 foot candles of illumination should be provided.

2.7.3. If shutoff valves are installed in the water line for maintenance purposes, provisions will be made to prevent accidental shutoff by providing either a sign or a tag at the valve indicating the water supply is for emergency use. The affected supervisor will be notified prior to shutting off the water supply.

2.8. Control Valve and Actuating Mechanism:

2.8.1. The control valve shall be designed to assure the water flow continues without requiring the use of the operator's hands. It shall remain on until intentionally shut off, shall be simple to operate (push-pull), and go from "off" to "on" in 1 second or less. Malfunctioning valves shall be replaced or repaired immediately.

2.8.2. The control valve will be operated by an easily located and readily accessible actuating device, such as a ring and chain attached to the lever or rocking arm of the valve, a walk-on treadle, or a push handle (**Figure 5.**).

2.9. Alarms and Lights . Audible alarms or blinking lights may be used to indicate that the unit is in operation. Units in remote areas or where an individual is working alone may be equipped with activating valves electrically connected to warning lights or buzzers positioned in occupied areas (dispatch offices, work areas, etc.) to alert personnel when the unit is activated so aid may be sent. In remote areas without electricity, the buddy system will be used in lieu of an alarm system. Supervisors of operations in which the buddy system is to be used will indicate clearly what each person is to do. When in doubt as to the type of buddy system to use, the supervisor should consult the ground safety manager. Buddies should know: the hazards involved in any operation; their duties as buddies; how to use prescribed rescue equipment, and emergency procedures. Remote operations such as missile sites may use the buddy system in lieu of an alarm system.

2.10. Maintenance and Testing:

2.10.1. Permanently-installed shower and eyewash units shall be activated by the supervisor monthly to verify proper operation. The unit only needs to be activated long enough to ensure there is adequate pressure and volume of water available and all orifices are free of obstructions. If a build-up of scale, rust, etc., is noted, spray heads or nozzles shall be removed and cleaned or replaced. The source of contamination will be eliminated if possible. Units installed in unoccupied or infrequently used areas are exempt from this testing requirement, but will be tested prior to commencing any operations that could expose personnel to hazardous operations.

2.10.2. The supervisor shall inspect permanently-installed units semiannually using the applicable portions of paragraph **3.** Documentation of the semiannual testing will be maintained to show date of test and name of individual doing the test. This documentation may be kept in a log, computerized, or affixed to the equipment by tag or label. (**Exception**: Units installed at missile sites

shall be tested by the team chief during the most frequently performed periodic inspection requirement established for that system and documentation will be recorded.)

2.10.3. Self-contained units shall be tested, refilled, and maintained according to manufacturer's instructions. If the manufacturer's instructions do not specify a fluid change interval, as a minimum, the fluid will be changed quarterly. Fluid level will be checked monthly. Missile sites are given the same exception as in paragraph **2.10.2.** Tags or labels will be attached to the unit or adjacent to it, showing the fluid change schedule.

2.10.4. Eyewash bottles shall have instructions and expiration dates if applicable, permanently affixed to the unit. They shall be tested, refilled, maintained, and disposed of according to the manufacturer's instructions.

2.10.5. All units will be inspected by ground safety and BE staffs during scheduled surveys for proper placement, installation, and documentation of supervisory testing and operation. Inspection personnel will also randomly check employees to see if they have been adequately trained on the use of emergency equipment.

2.11. Training . All employees whose duties expose them to conditions that may warrant the use of this emergency equipment shall be instructed in its use as a part of their job safety training. The initial treatment for a hazardous substance splash should be to wash the affected areas for a minimum of 15 minutes prior to seeking medical treatment. When parts of the body are involved, the clothing should be removed during the showering period. When the eyes are affected, it is important to hold the eyelids open and roll the eyeballs so water will flow on all surfaces and in the folds surrounding the eyeballs. Medical attention shall be sought immediately after using an emergency eyewash and shower.

2.12. Water Supply . When any maintenance is performed that would render an emergency shower or eyewash inoperative, the responsible supervisor shall be notified in advance of the outage and again as soon as service is restored. During the outage the supervisor will assure that self-contained units or eyewash bottles are available for emergency use. If this is not practical, the installation ground safety manager and BEE shall be contacted for guidance.

3. Performance Specifications and Installation Requirements for Permanent ly-Installed Units:

3.1. Emergency Showers:

3.1.1. The face of the emergency shower head shall be installed no less than 82 inches nor more than 96 inches in height from the surface on which the user stands. The spray pattern shall have a minimum diameter of 20 inches at 60 inches above the surface on which the user stands, and the center of the spray pattern shall be located at least 16 inches from any obstruction. An exception is that in a combination unit, the eyewash is not considered an obstruction for the purpose of determining the distance of the center of the spray pattern. Multiple-spray emergency shower units (figure 6) are exempt from these requirements and will be installed according to the manufacturer's specifications.

3.1.2. Enclosures, if used, shall provide for a minimum unobstructed area 34 inches in diameter in order to accommodate the movement necessary in an emergency situation.

3.1.3. Shower actuating devices shall be easy to locate and readily accessible to the user:

3.1.3.1. Hand pull devices should be located not more than 69 inches nor less than 55 inches above the surface on which the user stands.

3.1.3.2. Push handles and (or) paddles should be approximately 40 inches above the surface on which the user stands.

3.1.3.3. Foot treadles should not be more than 6 inches above the walking surface.

3.1.4. The shower shall be tested according to the following procedures:

3.1.4.1. With water pressure on and the valves closed, check the visible plumbing connections for leaks.

3.1.4.2. Ensure the face of the shower head is not less than 82 inches nor more than 96 inches from the surface on which the user stands. Multiple-spray showers are exempt from this requirement.

3.1.4.3. Move the valve to the full open position. The valve shall move smoothly and freely and remain open without requiring further attention from the operator.

3.1.4.4. With the valve in the "full on" position, the diameter of the spray pattern shall be a minimum of 20 inches at a height of 60 inches above the standing surface. The center of the spray shall be at least 16 inches from any obstructions. Multiple-spray showers are exempt from this requirement.

3.2. Eyewash Equipment:

3.2.1. Eyewash Units:

3.2.1.1. A means shall be provided to ensure a controlled flow of potable water or its equivalent is provided to both eyes simultaneously at a pressure low enough not to be injurious to the user. Normally this can be accomplished by providing a water stream that rises between 6 and 12 inches from the nozzle.

3.2.1.2. Nozzles should be protected from contamination, and if protective covers are used, their removal shall not require a separate motion by the operator when activating the unit.

3.2.1.3. Units shall be positioned with the water nozzles 33 inches to 45 inches from the surface on which the user stands. Eyewash-actuating devices shall be easy to locate and readily accessible. If a foot treadle is used, it should not be located more than 6 inches above the floor (**Figure 5.**).

3.2.2. Eye and Face Wash Units. The units (**Figure 7.**) shall meet the same criteria as an eyewash unit (paragraph **3.2.1.**) except they shall be capable of delivering a greater volume of water. This additional flow is required so the entire surface of the face may be irrigated.

3.3. Hand-Held Drench Hoses . Drench hoses (**Figure 4.**) shall provide a controlled flow of water to the eyes or to a portion of the body at a reduced water pressure that will not be injurious to the user's eyes, face, or body.

3.4. Combination Units . These units (**Figure 1.**) shall be installed so all components can be operated individually from a common water supply line and shall meet the previously stated performance and installation criteria for each component. It is not necessary for all components to operate simultaneously (individual conditions will dictate this requirement).

3.5. Self-contained Units . These units (**Figure 2.**) shall be constructed of non-corrosive materials, shall provide a minimum of 15 minutes continuous flow and the stored fluid shall be protected against contaminants and temperature extremes. These units may be filled with potable water or a solution

approved by either the manufacturer or the installation medical services. Instructions and expiration dates shall be permanently affixed to the unit.

3.6. Eyewash Bottles . Eyewash bottles (**Figure 3.**) shall have the capacity to deliver immediate flushing to the eyes. These bottles may be filled with potable water or an eye-flushing solution, either approved by the manufacturer or by installation medical services. Local procedures will be developed to prevent these units from being exposed to extreme temperatures and the instructions and expiration dates shall be permanently affixed to the unit.

Figure 1. Permanent Combination Emergency Shower and Face and Eyewash Unit.

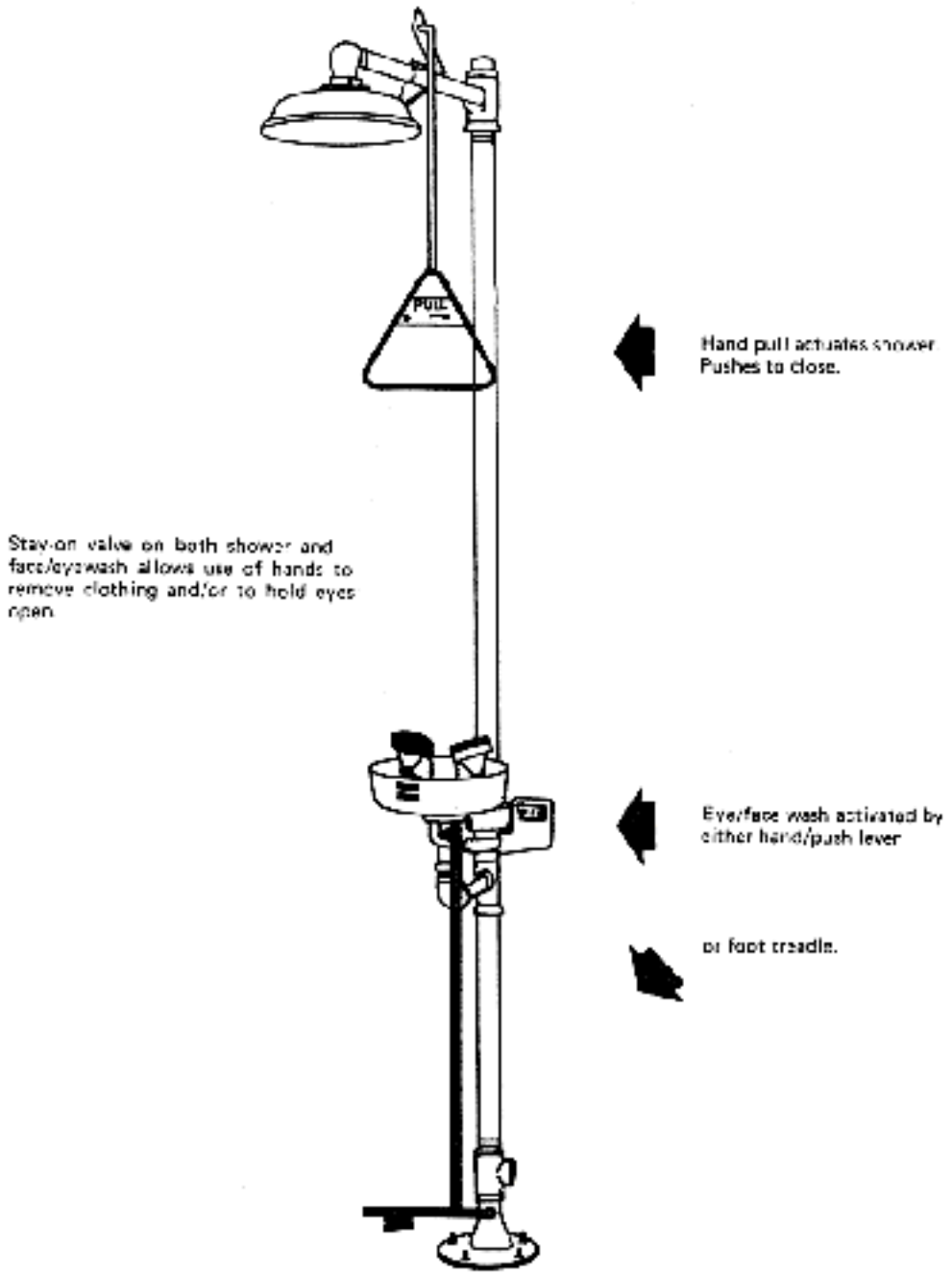


Figure 2. Self-Contained Non-Pressurized Eye Wash Unit.

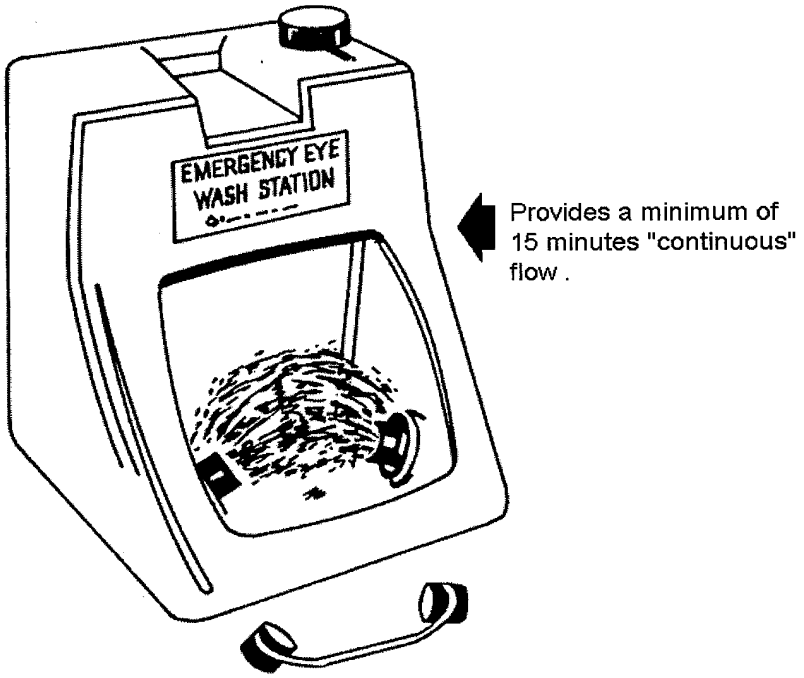


Figure 3. Eyewash Bottle.

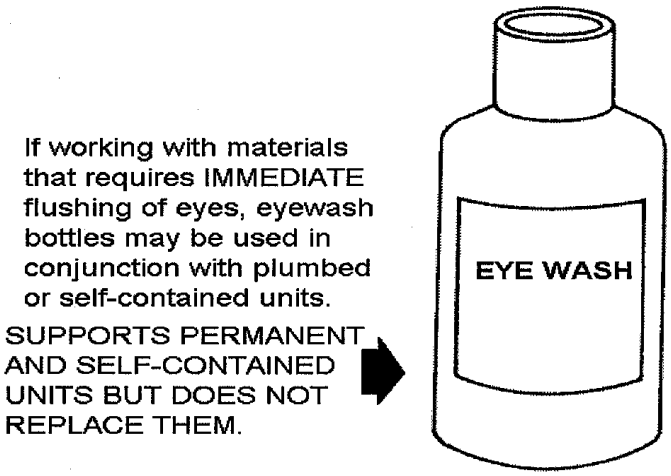


Figure 4. Hand-Held Drench Hose (Permanent).

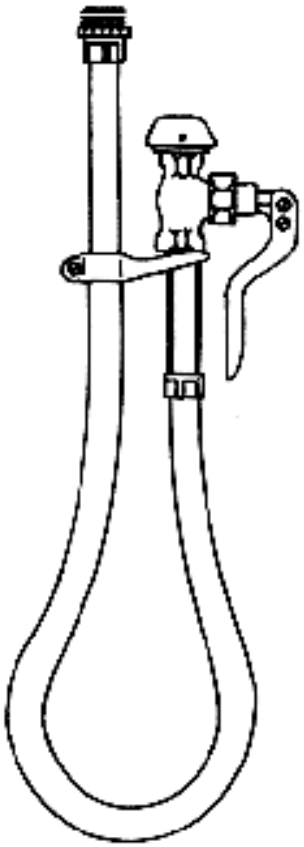
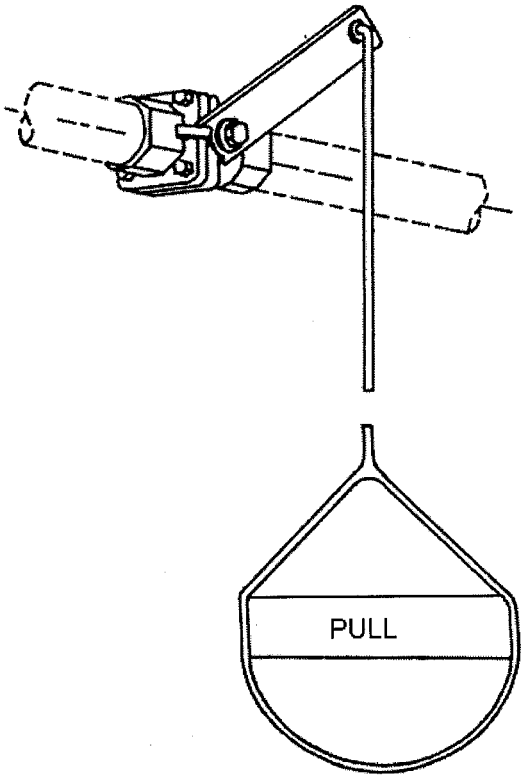
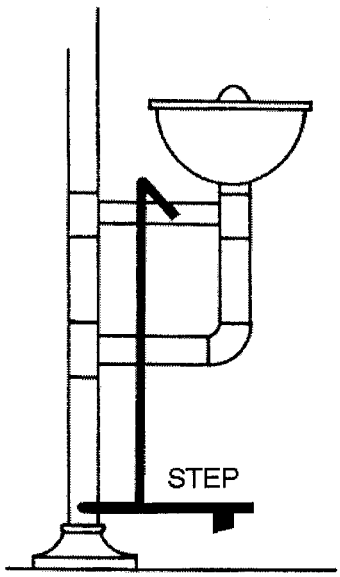


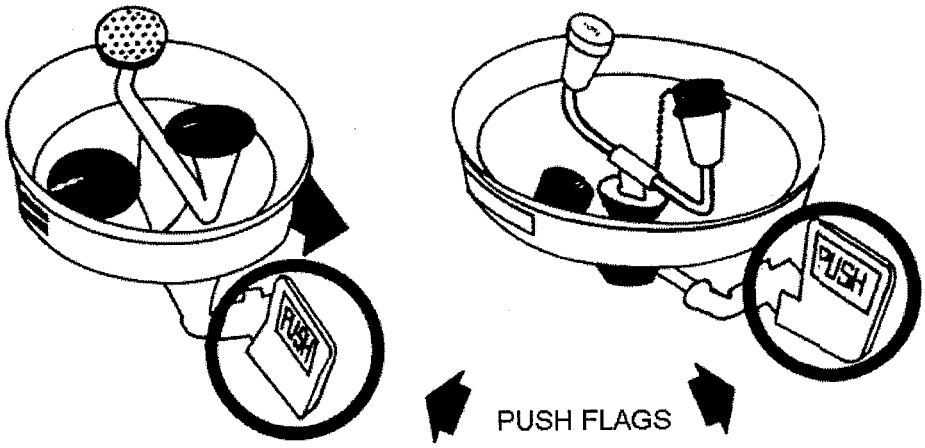
Figure 5. Activating Mechanisms.



Rigid pull rod and ring for shower.



FOOT TREADLE



PUSH FLAGS

Figure 6. Multiple-Spray Shower and Eyewash.

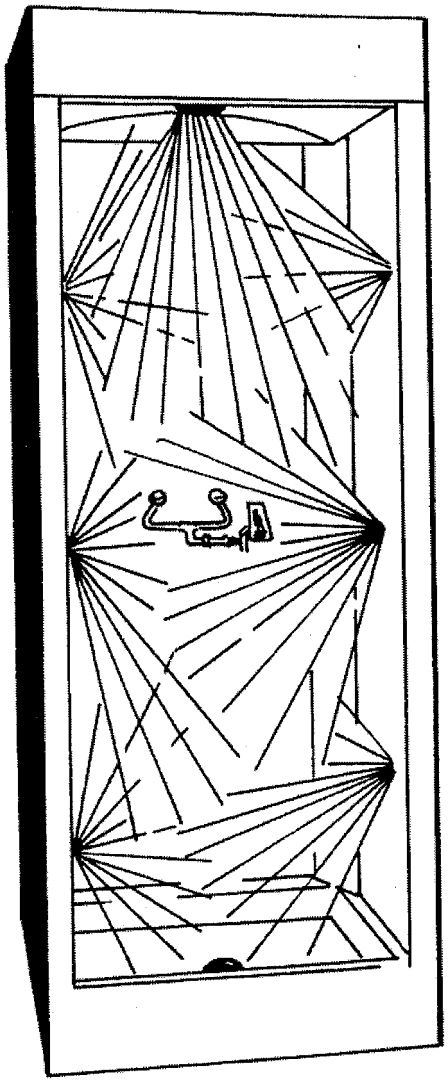
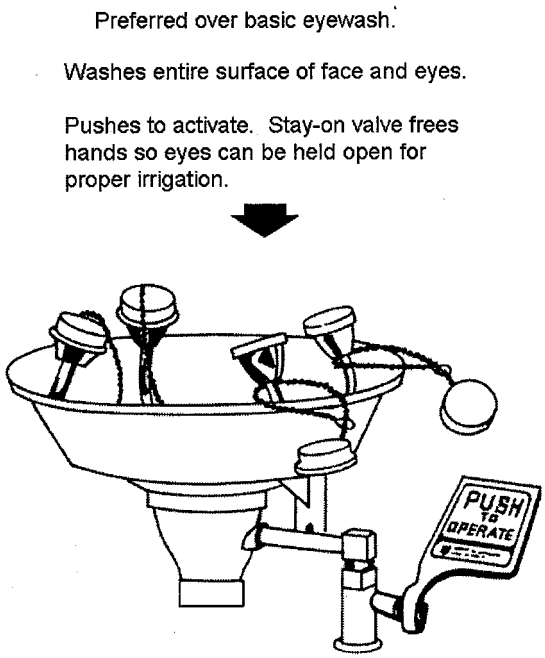


Figure 7. Wall-Mounted Permanent Eye and Face Wash.



FRANCIS C. GIDEON, JR., Maj Gen, USAF
Chief of Safety

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Air Force Instruction (AFI) 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program.*

Air Force Occupational Safety and Health (AFOSH) Standard 91-31, *Personal Protective Equipment.*

American National Standards Institute (ANSI) Z358.1, *Emergency Eyewash and Shower Equipment.*

Occupational Safety and Health (OSHA) Standard 29 Code of Federal Regulations (CFR) 1910.94, *Ventilation (*Subpart G, *Occupational Health and Environmental Control).*

OSHA Standard 29 CFR 1910.111, *Storage and Handling of Anhydrous Ammonia (*Subpart H, *Hazardous Materials).*

OSHA Standard 29 CFR 1910.151, *Medical Services and First Aid (*Subpart K, *Medical and First Aid).*

OSHA Standard 29 CFR 1910, 1910.268, *Telecommunications* (Subpart R, *Special Industries).*

OSHA Standard 29 CFR 1926.50, *Medical Services and First Aid (*Subpart D, *Occupational Health and Environmental Controls).*

OSHA Standard 29 CFR 1926.441, *Batteries and Battery Charging (*Subpart K, *Electrical).*

Abbreviations and Acronyms

AFI—Air Force Instruction

AFOSH—Air Force Occupational Safety and Health

AFSC—Air Force Safety Center

ANSI—American National Standards Institute

BE—Bioenvironmental Engineering

BEE—Bioenvironmental Engineer

CFR—Code of Federal Regulations

DRU—Direct Reporting Unit

F—Fahrenheit

FOA—Field Operating Agency

HQ—Headquarters

ICBM—Intercontinental Ballistic Missile

MAJCOM—Major Command

Mil Spec—Military Specification

ORM—Operational Risk Management

OSHA—Occupational Safety and Health Administration

PDO—Publishing Distribution Office

PPE—Personal Protective Equipment

TO—Technical Order

US—United States

WWW—World-Wide Web

Terms

Actuating Mechanism—A pull rod, chain, and ring, push flag, or foot treadle used to activate the control valve of an emergency shower or eye wash unit.

Buddy System—Two people, each responsible for the other's safety, are present in a hazardous situation. There are two types of buddy systems:

Both persons are subjected to the same hazard at the same time and each has to assure the other's well-being and assist if a mishap occurs.

One person is exposed to the hazard while the other is not and acts as an observer.

Combination Unit—A unit combining a shower with an eye and face wash or eyewash or with a drench hose, or both.

Corrosive—Any substance that burns, injuriously irritates, or destructively attacks organic tissues.

Emergency Shower—A unit that cascades water over the entire body.

Emergency Shower Head—A high-volume spray head specially designed for use on an emergency shower.

Eye and Face Wash Unit—A unit used to irrigate and flush both the face and the eyes.

Eyewash Bottle—A squeeze type or plunger-actuated bottle which supplements permanent units, portable units, or both.

Eyewash Unit—A unit used to irrigate and flush the eyes only.

Hand-Held Drench Hose—A flexible hose connected to a water supply and used to irrigate and flush eyes, face, and body areas.

Hazardous Material—A substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, increases the probability of exposing the individual to an injury-producing situation.

Irritant—Substances that when blown or splashed onto the body or into the eyes will not normally cause lasting or permanent damage, but will definitely irritate the skin or eyes.

May—Indicates an acceptable or satisfactory method of accomplishment.

Multiple-Spray Shower Unit—A unit using more than a single head and delivering water from more than one direction.

Permanent Eyewash and Shower Units—Units connected to a source of drinkable water by permanent plumbing.

Self-Contained Emergency Shower or Eyewash Unit—A unit that must be refilled or replaced after

use and may be portable or fastened to a supporting structure.

Shall—Indicates a mandatory requirement.

Should—Indicates a preferred method of accomplishment.

Stay-Open Valve—A valve that will remain in the open position and continue to deliver water until manually closed.

Will—Is also used to indicate a mandatory requirement and in addition is used to express a declaration of intent, probability, or determination.

Attachment 2

EMERGENCY SHOWER AND EYEWASH UNITS CHECKLIST

A2.1. Does installation of emergency shower or eyewash units, after the publication date of the standard, conform to requirements established by the standard? (Refer to paragraph 2.2.)

A2.1.1. Have previously installed units that do not meet the criteria of this standard been evaluated by the installation ground safety and BE staffs? (Refer to paragraph 2.2.)

A2.1.2. In areas where employees are exposed to severe hazards, are units brought into compliance with this standard? (Refer to paragraph 2.2.)

A2.2. Do supervisors ensure that emergency showers and eyewashes are provided, inspected, tested, and maintained according to this standard and has the necessity for the unit been evaluated and documented? (Refer to paragraph 2.3.)

A2.3. If installed, are hand-held drench hoses used only to support shower and eyewash units and not to replace them? (Refer to paragraph 2.4.)

A2.3.1. If self-contained units and eyewash bottles are used, is their use approved by the installation ground safety manager and the BEE? (Refer to paragraph 2.4.)

A2.3.2. If eyewash bottles are provided in areas where employees are working on extremely hazardous operations, are they used only as supplemental protection? (Refer to paragraph 2.4.)

A2.4. If Mil Specs are not used when obtaining emergency shower and eyewash units, do procuring documents specify that the equipment will meet or exceed ANSI Z358.1 requirements? (Refer to paragraph 2.5.)

A2.5. Are emergency shower and eyewash units: (Refer to paragraph 2.6.):

A2.5.1. In conspicuously identified accessible locations that do not require more than 10 seconds to reach and are **within 100 feet of the corrosive substance**?

A2.5.2. Located so the water spray does not make contact with any energized electrical circuit?

A2.6. Is the emergency shower installed in conjunction with, or in close proximity to, the eye and face or eyewash facilities? (Refer to paragraph 2.6.)

A2.7. Are the units connected to a supply of water that is free from contamination and equal in purity to potable water? (Refer to paragraph 2.7.)

A2.7.1. Is the delivered water temperature in a comfortable range that would not discourage use of the unit? (Refer to paragraph 2.7.)

A2.7.2. Are self-contained units and the water supply lines of permanently-installed units protected from freezing and from sunlight or other heat sources that could cause extremes in water temperature? (Refer to paragraph 2.7.)

A2.7.3. Are permanently-installed and self-contained units installed in a fixed location identified with a highly visible sign and are they well lighted? Is highlighting (green and white stripes) of the unit needed to increase visibility? (Refer to paragraph 2.7.)

A2.7.4. Where shutoff valves are installed in emergency shower and eyewash unit supply lines, have signs or tags been installed to prevent accidental shutoff? (Refer to paragraph 2.7.)

A2.8. When actuated, does the water flow remain on without the use of the operator's hands? (Refer to paragraph 2.8.)

A2.8.1. Is the control valve simple to operate (push-pull) and does it go from "off" to "on" in less than 1 second? (Refer to paragraph 2.8.)

A2.8.2. Is the actuating device, (pull handle, walk-on treadle, or push handle) readily accessible and easily located? (Refer to paragraph 2.8.)

A2.9. Do units in remote areas, or where an individual is working alone, have an activating valve electrically connected to warning lights or buzzers positioned in occupied areas to alert personnel when the unit is activated? (Refer to paragraph 2.9.)

A2.9.1. If audible alarms or blinking lights are installed to show that the unit is in use, are they working properly? (Refer to paragraph 2.9.)

A2.9.2. In remote areas without electricity, is the buddy system used? (Refer to paragraph 2.9.)

A2.9.3. When the buddy system is used, are personnel apprised of the hazards involved, what their duties are, how to use rescue equipment, and emergency procedures that are to be followed? (Refer to paragraph 2.9.)

A2.10. Do supervisors activate permanently-installed shower and eyewash units monthly to verify proper operation? (Refer to paragraph 2.10.)

A2.10.1. Are inadequately operating units repaired or replaced? (Refer to paragraph 2.10.)

A2.10.2. If shower heads or spray nozzles are continually clogging up, has any attempt been made to eliminate the source of contamination? (Refer to paragraph 2.10.)

A2.10.3. Are units that are installed in unoccupied or infrequently used areas tested prior to commencing any operations that could expose personnel to hazardous substances? (Refer to paragraph 2.10.)

A2.11. Do supervisors inspect permanently-installed units semiannually according to instructions in paragraph 2.10.? Are semiannual inspections documented, reflecting the date of test and the individual performing the inspection and (or) test? (Refer to paragraph 2.10.)

A2.11.1. Is the fluid level of self-contained units checked monthly and changed as required by the manufacturer or quarterly if not specified? Are tags or labels attached to the unit or adjacent to it reflecting the fluid change schedule? (Refer to paragraph 2.10.)

A2.11.2. Are eyewash bottles maintained according to the manufacturer's instructions? (Refer to paragraph 2.10.)

A2.11.3. Do installation ground safety and BE staffs inspect emergency shower and eyewash units during surveys? Do they randomly check employees to determine if they have been adequately trained in the use of emergency equipment? (Refer to paragraph 2.10.)

A2.12. Are employees, whose duties expose them to conditions that may warrant the use of emergency equipment, properly trained? (Refer to paragraph 2.11.)

A2.13. When maintenance renders emergency shower or eyewash units inoperable, are adequate measures taken to safeguard employees? (Refer to paragraph 2.12.)

A2.14. Is the face of the emergency shower head installed in the 82-96 inches range in height from the surface on which the user stands? (Multiple-spray units are exempt from its requirement.) (Refer to paragraph 3.1.)

A2.14.1. Does the spray pattern of the emergency shower head have a minimum diameter of 20 inches at 60 inches above the surface on which the user stands? (Refer to paragraph 3.1.)

A2.14.2. Is the center of the spray pattern located at least 16 inches from any obstruction? (Multiple-spray units are exempt from this requirement.) (Refer to paragraph 3.1.)

A2.15. Are emergency shower actuating devices easy to locate and readily accessible to the user? (Refer to paragraph 3.1.)

A2.15.1. Are hand pull devices of the emergency shower approximately 55-69 inches above the surface on which the user stands? (Refer to paragraph 3.1.)

A2.15.2. Are push handles and (or) paddles of the emergency shower approximately 40 inches above the surface on which the user stands? (Refer to paragraph 3.1.)

A2.15.3. Are foot treadles of the emergency shower not more than 6 inches above the walking surface? (Refer to paragraph 3.1.)

A2.16. Are emergency showers tested and (or) checked? (Refer to paragraph 3.1.)

A2.17. Is a means provided for eyewash units to ensure a controlled flow of potable water or its equivalent to both eyes simultaneously, at a pressure low enough not to be injurious to the user (e.g., 6-12 inches from the nozzle)? (Refer to paragraph 3.2.)

A2.17.1. If protective covers are installed to protect the nozzles from contamination, is the removal process automatic so the user only has to push the actuation handle in order to use the eyewash? (Refer to paragraph 3.2.)

A2.17.2. Are units positioned with the water nozzle 33 to 45 inches from the surface on which the user stands? (Refer to paragraph 3.2.)

A2.17.3. Are the actuating devices easy to locate and readily accessible? (Refer to paragraph 3.2.)

A2.17.4. Is the foot treadle, if used, located not more than 6 inches above the floor? (Refer to paragraph 3.2.)

A2.18. If installed, does the drench hose provide a controlled flow of water to the eyes or to a portion of the body at a reduced water pressure so the user's eyes, face, or body are not injured? (Refer to paragraph 3.3.)

A2.19. Are combination units installed so all components can be operated individually from a common water supply line and also meet all the previously stated performance and installation criteria for each component? (Refer to paragraph 3.4.)

A2.20. Are self-contained units constructed of non-corrosive material? (Refer to paragraph 4.)

A2.20.1. Will they provide a minimum of 15 minutes **continuous** flow? (Refer to paragraph 4.)

A2.20.2. Is the stored fluid protected against contaminants and temperature extremes and are instructions permanently affixed to the unit? (Refer to paragraph 4.)

A2.21. Do eyewash bottles have the capacity to deliver immediate flushing to the eyes? (Refer to paragraph 5.)

A2.21.1. Are they filled with potable water or an eye-flushing solution, either approved by the manufacturer or by installation medical services? (Refer to paragraph 5.)

A2.21.2. Have procedures been developed to prevent these units from being exposed to extreme temperatures and are the instructions and expiration dates permanently affixed to the unit? (Refer to paragraph 5.)